WEIGHT PERCEPTION DISCREPANCY AMONG ETHNICALLY DIVERSE YOUTH

A Thesis

by

KATE DUNCAN CROMWELL

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

August 2011

Major Subject: Recreation, Park and Tourism Sciences

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Approved by:

Chair of Committee,	Peter A. Witt
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ABSTRACT

Weight Perception Discrepancy Among Ethnically Diverse Youth.

(August 2011)

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Weight perception discrepancy, the difference between a person's medically classified weight status and their weight status as classified by their body mass index, is a growing problem. Such misperceptions of weight may be a barrier to treatment for weight-related health conditions. Youth who are overweight, but do not feel they are, may be less likely to initiate treatment, which places them at a higher risk for many obesity related health conditions. Similarly, youth who are underweight, but do not feel they are, may be at risk for negative health conditions. Social Comparison Theory may provide a tool for evaluating identified discrepancies. Given that minorities have higher obesity rates, it is hypothesized that weight perception discrepancy is higher among these groups, as the comparison is with heavier than normal peers, it may be skewed. This study used the Center for Disease Control's Youth Risk Behavior Surveillance System from 2009 to evaluate weight perception discrepancy among Caucasian, African American and Latino youth. Multinomial logistic regression was used to evaluate discrepancies among these groups. Findings indicated that weight perception discrepancy varied by both gender and ethnicity. Females were more likely to over-

estimate their weight category, and Latino and African American males were more likely to under-estimate their weight category. Caucasian males were used as the comparison group for all estimations. Social Comparison Theory may provide a plausible explanation for the weight perception discrepancy differences identified for both minorities and females.

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CHAPTER I

INTRODUCTION

Problem Statement

Weight perception discrepancy, the difference between a person's medical weight class (BMI) and the weight class in which they place themselves, may be a barrier to treatment for relevant weight related health conditions. Obesity is emerging as a chronic health problem among all ethnic groups within the United States.[1] However, people who do not feel they are underweight may actually be at risk for many chronic health problems related to their weight[2]. Many health problems, including early osteoarthritis, abnormal heart conditions, and emotional stress, can result from being significantly underweight.[3] Health problems related to obesity include high cholesterol, early onset heart-disease, high blood pressure, and increased arthritis.[4] Adolescents who are underweight, but do not categorize themselves as such, often have eating disorders that place them in an category very similar to those who do not identify as overweight.[5]

For those individuals who identify as overweight or obese, much assistance is provided; however, it is important to educate people about appropriate weight categories so they can successfully evaluate their own weight status. People who do not feel they are overweight are less likely to begin a weight-loss program.[6] Similarly, people who do not feel they are underweight are unlikely to stop a weight-loss regimen or diet.[7]

This thesis follows the style of the *Journal of the American Medical Association.*

Weight perception discrepancy (WPD; the difference between a person's actual weight and how they feel about their weight) research indicates a person does not always preceive themselves the way they appear. Despite increased attention towards increasing weight awareness, many of those at risk for health problems do not identify themselves as having a weight-related issue. Identification of weight, whether it is obesity or disorder eating patterns, is thought to be critical to successful intervention.[8]

Research has indicated people who do not identify themselves as overweight are less likely to begin a regimen to reduce their weight, e.g. engage in physical activity or improved dietary habits.[9] Therefore, it is important to understand why certain youth perceive their weight incorrectly, and what can be done to help minimize this discrepancy. It may be important to evaluate weight perception as a possible contributor to increased obesity, as people who do not perceive themselves as overweight are less likely to seek medical help or to begin a weight-loss program independently versus those who identify that they have a weight issue.[7]

Weight perception is highly influenced by the media. Constant media pressure, mainly to resemble models and celebrities, encourages youth who are underweight to continue their unhealthy dieting habits.[2] However, the problem may be more innate, as youth may not feel they are underweight and actively work to further reduce their weight.[3] There are clear links between media and increased weight perception issues in adolescent girls, but the extent to which weight perception influences the likelihood of seeking treatment is not as well documented.[10]

The discrepancy between individual weight-perception and actual body-mass index (BMI) has been studied in adults; however, little research has been done to evaluate the discrepancy among children. Therefore, this study seeks to evaluate the relationship between weight perception and body mass index (BMI) across children aged 12-18 year who identify as members of one of three racial/ethnic groups: Caucasian, African-American, and Latino.

Weight discrepancy research among Caucasians, African-Americans and Latinos can provide practitioners and medical professionals with information about cultural factors that may be related to weight. For example, interventions may need to be more sensitive to cultural perceptions of beauty and weight norms. If youth are better able to understand and acknowledge their actual weight, they may be more motivated to seek to be in a normal weight category.[11, 12]

One potential theoretical framework to explain why weight perception discrepancy exists is Social Comparison Theory (SCT). This theory holds that we use others as a basis of comparison to make judgments about ourselves. In the context of youth, SCT implies youth constantly compare themselves to others; and if a peer group is at risk for overweight, or is overweight, youth may not feel compelled to practice appropriate weight management behaviors.[13] Research has shown gender differences related to weight perception could be attributed to SCT.[14-18]

Youth-related weight discrepancy research is quite sparse. In one study, Mehi-Sibai, Kanaan, Chaaya, Rahal, Abdullah and Sibai (2003) found differences in weight discrepancies between Muslim and Christian adolescent girls in Beirut, Lebanon. These

results suggest that girls living in similar conditions, but identifying with different ethnicities, feel differently about their bodies. Additional research of youth has found girls are far more likely to over-perceive their weight and have negative feelings related to their body.[13, 19, 20]

Gender differences in weight perception have been evaluated in males and females. The most extensive research into weight perception has been conducted with adolescent females. This research found girls are likely to perceive themselves as heavier than their actual weight.[13] The evaluation of girls in this research is often focused on disordered eating, but information about weight perception may provide practitioners with information about how to help females before they are fully diagnosed with eating disorders, such as anorexia or bulimia. Unlike females, research has shown males are more likely to under-perceive their weight; this perception may be intentional so males do not feel they are weak.[19] In addition, the interaction between gender and ethnicity has not been widely researched.

Research related to ethnicity and other health behaviors has documented that ethnicity is a significant predictor for many health behaviors.[21-23] The knowledge that ethnicity influences participation in many pro-health behaviors, such as regular check-ups, mental health screening, vaccinations, dental cleaning, and other preventative care, places an increased significance on understanding the relationship between WPD and ethnicity among youth.[24-29]

While there is a limited amount of research focused on discrepancy differences between ethnic groups, research to examine weight perception and BMI across parent-

child relationships, as well as adults' self-perception, is underway.[6, 8, 12, 30-33] While relationships regarding weight discrepancy have been documented for adults, it is important to undertake more research regarding discrepancies between reported weight and BMI in youth.

Research Questions

Given the need for more research concerning differences in weight discrepancies among children from different ethnic groups, the purpose of this research is to determine the relationship between weight perception discrepancies across a sample of United States youth from three racial/ethnic groups (Caucasian, Latino and African-American) enrolled in middle or high school in the first academic quarter of 2009. The central research questions were:

1) What are the relationships between ethnicity and WPD for youth in the three ethnic groups?
2) What is the relationship between gender and WPD for youth in the three ethnic groups?

To address these questions, data from the 2009 Youth Risk Behavior Surveillance System Survey, completed by the Center for Disease Control, were analyzed. Testing was conducted across gender and racial/ethnicity status.

CHAPTER II

LITERATURE REVIEW

Weight related issues are a major national health concern. While considerable attention has been devoted to reducing obesity, people who are underweight are also at an increased risk for numerous health related illnesses and social isolation.[12, 34, 35] Many of these health risks are more prevalent among minority groups than non-minority groups, which may be a result of more limited access to health care, or of perceptions about what constitutes health.[36, 37]

Research has identified many reasons for differences in perception of health and wellness among minorities.[25, 29, 37, 38] While these perceptions have been evaluated in adults, they have not been fully evaluated among children. The ability to properly identify individual weight class may motivate a person to seek appropriate treatment to either gain or lose weight as needed. However, failure to recognize oneself as a member of the appropriate weight class may discourage an individual from entering an appropriate weight management support program.[7] Thus, understanding the processes that lead a person to properly identify their weight category is critical. Social comparison theory (SCT) may provide an explanation for why WPD might exist. SCT states that we use others with whom we interact as a basis for judgments about ourselves; therefore, SCT provides the basis for a potential hypothesis concerning why people do not correctly perceive their weight.[13] People may be more likely to make a comparison with others who are perceived as heavier or lighter, which subsequently could influence how they feel about their actual weight.

Understanding WPD could enable research to evaluate the extent to which SCT influences weight perception. The discrepancy between actual weight classification and weight self-perception has been widely documented in adults and for how parents perceive their children's weight. However, research involving how children perceive their own weight compared to their medical classification has been limited.

The following literature review will outline the status of obesity and the status of those who are underweight, discuss health perception issues specifically related to minorities, outline current weight perception discrepancy research, review the literature related to possible causal factors for weight perception discrepancies, provide an overview of SCT, and assess research related to weight and body image and SCT.

Status of Obesity

Over the past 30 years, obesity rates for school age children have tripled and continue to increase.[39] Increases in obesity rates among youth have created a group of children who are at high risk for a plethora of chronic health conditions, such as diabetes, cardiovascular disease, hypertension, cholelithiasis, osteoarthritis, stroke.[40] It is estimated that 300,000 deaths per year are caused by obesity related illnesses.[4] In the most recent "call to action," the Surgeon General indicates that weighing as little as two extra pounds increases the risk for arthritis by 9-13%, with the risk increasing with each additional pound a person carries[4]. There are many health concerns associated with being overweight or obese. However, despite awareness of their actual weight, people might not be aware of the definitions of overweight and obese and the criteria used for each category[33].

According to the Centers for Disease Control, obesity is defined as having a BMI at or above the 95th percentile [41]. BMI is defined as the relationship between a person's weight and their height. Standard BMI classifications include underweight, normal weight, overweight and obese. Statistics from 2008, provided by the National Center for Health Statistics, indicated that 18% of adolescents between the ages of 12-19, 20% of children ages 6-11, and 10% of children ages 2-5 were considered obese.[42] Among adolescents, the prevalence of obesity is highest among adolescent minority females.[43]

Just as adolescents have higher rates of obesity compared to those in other age groups, members of some minority groups show an increased incidence of obesity as compared to the rest of the population.[36] This higher rate may be the result of both environmental factors, e.g., access to parks, distance from the availability of healthy food, as well as genetic factors; however, other factors, such as social expectations, access to appropriate role models, and familial modeling, which are more difficult to isolate and evaluate, are also thought to impact obesity rates.[18, 44, 45]

The statistics for those considered overweight are even more alarming. Overweight is defined as a body mass index at or above the 85th percentile.[41] Twenty percent (20%) or more of children in all age groups are classified as overweight.[41] Unfortunately, individuals who are overweight or obese as children are at a much higher risk for being obese as adults.[46] Thus, to help children manage their weight before other health problems occur, it is important to provide resources for those who are at risk for being overweight or obese.

Cultural norms may also be important when evaluating obesity.[40] Cultural viewpoints, such as those related to ideas of beauty, may influence perceptions of obesity. Understanding cultural norms could provide practitioners with valuable information when creating programs targeted for specific groups. Community health initiatives need to provide programming that follows cultural norms for each distinct cultural group in order to ensure that programs target multiple groups.

Status of Underweight

While obesity continues to be the primary focus of intervention programs, it is also important to evaluate the literature related to issues associated with being underweight. Media is widely considered to contribute to the prevalence of eating disorders in the United States[2]. Research has shown that, over the past 50 years, females who are on television have gotten progressively skinnier and over half of all women on television currently meet the DSM-IV criteria for anorexia nervosa.[3] While fewer adolescents are classified as underweight, many of these youth struggle with eating disorders that will affect them for the rest of their lives.

The criteria for an eating disorder are best defined by the DSM-IV-TR. People who have eating disorders have an intense fear of gaining weight and becoming fat and refuse to maintain a body weight at or above the minimal boundaries of normal weight.[47] The most common types of eating disorders are Anorexia Nervosa (either restricting or binge-eating/purging types) and Bulimia Nervosa (either purging or nonpurging types). In addition, the latest version of the DSM has added an eating disorder not otherwise

specified, which is an available diagnosis for those that do not meet the criteria for the specified versions, but still have significantly disordered eating patterns.[47]

The thin ideal, which is portrayed in the media as thinness being a desirable beauty trait, is thought to contribute to the obsession many girls have with being thin. Research has found that, when prompted, the majority of women who reside in the United States indicate that the ideal body is thin.[48] The desire to be thin has led to an increase in dieting. As such, dieting has been shown to be a predictor of binge eating, heavy use of laxatives, and purging behavior among women.[48] In one study of dieting, binge eating, and purging among adolescent girls, youth belonging to different ethnic groups reported engaging in dieting, binge eating, and purging with the highest prevalence found in Caucasian and Latino females.[18] Binge eating occurs when a person consumes an unusually large amount of food in one single sitting. Often, compensatory behaviors, such as laxative use or purging (forced vomiting) are engaged in after a binge. Youth who binge and purge are at a higher risk for many gastro-intestinal illnesses, as well as tooth enamel decay.[49]

Weight Discrepancy Research

Weight discrepancy can be described as the difference in perceived weight status and actual BMI. It is important to study these discrepancies since they may influence weight management behaviors and actions. Adolescents, who do not believe they have a weight-related issue, are less likely to seek treatment to return to a normal weight category.[12, 50, 51] Research indicates that weight perception is a key factor in determining which youth will seek assistance with appropriate weight management practices.[12] In

addition to weight perception being detrimental to weight management behavior, research has found other behaviors influence youth who are seeking to begin a diet. In one study utilizing a national sample of adolescents in grades 9-12, students who practiced unhealthy diets and engaged in significant amounts of sedentary behavior were less likely to seek help to manage their weight, regardless of weight classification.[1] This finding suggests the importance of teaching youth to accurately perceive their body-weight.

Given that obesity has been found to be more prevalent among minorities, it is important to evaluate research that analyzes weight perception discrepancy across different racial/ethnic groups. For example, results from a study of women in three racial/ethnic groups (White, African American and Latino) showed cultural differences in the perception of being overweight and documented that adult minority members were significantly heavier than non-minority members when they sought help to begin a weight-loss regimen in a structured medical environment.[52] This finding is important since the greater peoples' weight when they begin a weight-loss regimen, the longer they will have to work to first lose weight and then maintain a healthy weight once BMI is back within normal limits. Practitioners may be better able to design treatments to appeal to members of different cultural groups if they know what factors cause a person from a specific racial/ethnic background to seek weight loss treatment, or to try and control their weight in the first place.

Disordered eating is often thought to be a "disease of the wealthy," as youth who are diagnosed with eating disorders tend to be upper-middle class, Caucasian girls.[53-56]

However, there has been recent documentation of increased prevalence of disturbed eating and dieting practices among minority adolescent females.[57] One hypothesis is that this increased prevalence is actually more than what is measured and documented, as many youth are considered to be outside the criteria for eating disorder diagnoses determined by the DSM-IV-TR, but still participate in unhealthy dieting to lose weight they may not need to lose.[58]

Weight-perception discrepancies have been widely evaluated in the adult population.[6-8] In a large sample of ethnically diverse adults over the age of eighteen (n=41,676), Chang and Christakis[6] found that those who were medically classified as overweight were less likely to accurately identify their weight classification compared to those in other weight categories. A separate evaluation performed by the same research team found 38.3% of normal weight women self-selected their weight as overweight.[59] It is clear that those who struggle with being underweight and overweight have skewed perceptions of weight.

Building upon the findings by Chang and Christakis, Dorsey, Eberhardt, and Ogden evaluated weight perception discrepancies across three racial/ethnic groups (Caucasian, African American and Mexican-American) and found minority group members were more likely to misidentify their weight category (underweight, overweight, or about the right weight) when asked to self-select their weight.[8] Similar research has evaluated how religious affiliation (Jewish, Christian or "Other") influences perception of weight.[60] In Kim's[60] study, adults who identified as Jewish were more likely to not perceive being overweight or obese, while adults who identified as

Christian were more likely to indicate they were overweight when they were actually considered normal weight.

A potential cause for the identified discrepancies is that people identify their weight incorrectly to protect their self-esteem.[7] For example, in one study, people who perceived themselves as lower in weight than their actual weight showed higher levels of confidence in physical activity and mental wellness[7] Muennig and his colleagues evaluated a large sample of adults (n=247,027) across a number of different racial/ethnic groups (Non-Hispanic White, Non-Hispanic Black, Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, and Other) and found that psychological issues, as well as negative body image, explain some of the underlying medical issues associated with obesity.[7] However, further research is needed to determine if minorities are more likely to misinterpret their weight.

Research regarding discrepancies in weight perception has also examined parental perceptions of their child's weight by comparing parental identification of their child's weight classification to the child's actual weight classification.[31, 32] Similar to findings from studies on adult weight perception, researchers have found that parents often placed their children in weight categories which were lower than their child's actual weight; this tendency could be the result of a coping mechanism.[31] Parents may feel they have failed if they have an overweight child. To cope with their feelings of failure, they misclassify their child's weight. For example, research that evaluated primarily parents of Caucasian students from public elementary schools in Utah and found that parents of obese children were most likely to misclassify their child's weight

as lighter than it actually was, and parents of boys who were underweight were likely to classify their weight as heavier than it actually was.[31]

In another study, results indicated that, among predominately Caucasian, low-income parents with overweight and obese children ages four to eight, who were regularly taken to their pediatrician, correctly identified their child's weight status 15 percent of the time.[61] This research is significant since, despite discussions of healthy lifestyles upon parent and child pediatrician visits, some parents still misclassified their child's weight. These findings indicate that the misclassification of a child's weight status may be more than a lack of understanding about BMI and weight.

As youth age, it is more common for parents to place pressure on their children to lose weight; this was found to be especially true among mother-daughter relationships.[62] Research has found mothers are more likely to identify their daughter as being overweight when she is actually in a normal weight category.[63]

One possible reason for consistent weight perception discrepancies among parents about their children is there may be a potential stigma associated with being the parent of an overweight or obese child. Although there is limited research in this area, parents may feel that, if their child is overweight, this reflects poorly on their parenting skills.[64] Related to parenting skills, research has shown children who are overweight or obese are more likely to be victims of parental neglect, implying that perceptions of weight may impact the parent-child relationship.[40] For example, in a study of New Zealand high school students, those who were overweight or obese were more likely to be abused resulting in an increased prevalence of depression.[65] It can be hypothesized

that children are likely to use eating as a coping mechanism for the abuse. However, research has not pursued other possible causes for increased abuse and neglect among children who are overweight and thus, it is hard to determine causal relationships with the limited research which currently exists.

Some research has focused on minority parent-child relationships and weight perception discrepancy. For example, a study of African American mother's perceptions of their daughter's (ages 2 to 17) weight category found that over half of mothers underestimated their daughter's weight.[32] Among Caucasian women, it was found mothers were more likely to over-estimate their daughter's weight.[63] This again implies that there is a significant cultural difference in weight perception behavior. As discussed earlier, African American girls place more emphasis on personality traits over physical appearance when asked to evaluate beauty.[20] Coupled with the difficulty mothers have when trying to identify their daughters weight, this may indicate there are clear cultural variations in what is considered healthy weight.[66]

Parental attitudes towards weight-perception may mirror attitudes towards other medically diagnosed disorders. Many disorders come with an associated stigma, and while obesity is not a disorder according to the DSM-IV-TR, there are diagnosable disorders related to weight (such as eating disorders). Researchers, using a nationally representative sample of parents of youth in grades 7-12, found parents may perceive weight issues as a disorder, much like attention deficit disorder, and may misclassify their child to avoid any stigmas associated with the label.[67] It has also been found being thin may be met with a stigma as society may assume thin people naturally have eating

disorders.[68] Similar to parents who avoid having their children diagnosed with a learning disability, weight misclassification may occur to prevent their child from being labeled as "troubled." Research has shown discrepancies among parental weight identification do exist in both directions and may contribute to discrepancies in youths' own perception of their weight classification. Children who are overweight or obese experience a variety of social and emotional issues and parental attitudes towards overweight or obese may strongly influence a child's weight perception.

Parental misidentification of their child's weight is only one potential cause of weight perception discrepancy among youth. While relatively limited, research has been done to evaluate how youth and adolescents perceive their own weight[12, 69, 70]. For example, research has found that adolescents frequently mislabel their weight classification; findings may indicate either a body image distortion issue or a more general lack of knowledge about what defines a healthy weight[12]. However, this research provides little information about whether certain groups are more likely to misinterpret their weight, as discrepancies were not analyzed across racial/ethnic groups[12].

Weight discrepancy has a profound influence on the behavior of adolescents[69, 71]. Research suggests that adolescents modify their behavior based on how they feel that they look. For example, youth who perceive themselves as being at a healthier weight are more likely to engage in sexual behaviors.[69] In addition, research has shown youth who identify with certain social groups were also shown to have a higher prevalence of exercise and disordered eating; indicating peer group affiliation may influence social processes and weight perception among youth.[71] Specifically, in a study of 705

adolescents aged fourteen to nineteen, weight perceptions varied depending on affiliation with one of five peer groups (i.e., jocks, brains, burnouts, populars, and alternatives); students who affiliated with the burnouts were more likely to eat poor diets and not participate in physical activity. Thus, peer group affiliation may influence eating and exercise habits and may possibly factor into weight perceptions.[71] Interestingly, African American youth in all peer groups were found to participate in physical activity and diet less than other peers within the same peer group.[71]

Given the above studies, it appears that weight perception is influenced by a variety of youth behaviors. Gender is another influential factor for determining weight perception. Weight discrepancy research has found that it is more common for adolescents to overestimate their height but underestimate their weight.[30] In a study of British teenagers, researchers found Caucasian girls were more likely to overestimate their weight while members of all minority groups were likely to underestimate their weight.[72] It is believed that encouraging youth to not feel they are overweight, when in fact they are (behavior which can lead to eating disorders), may have led to an increased prevalence of under-estimation of weight.[72] This is one of only a few research studies that address racial/ethnicity differences among adolescents with regard to WPD. Overall, available research does not lead to a clear understanding about whether WPD among minorities is significantly different than WPD among white youth.

Gender differences in WPD have also been researched. Research findings indicate that males are more likely to underestimate and females overestimate their weight.[9] These findings indicate that cultural weight norms may play a role in a

person's ability to predict their own weight as society has certain views of how females and males should look. In general, boys are thought to be wimps if they are too slender and girls are considered unattractive if they are overweight.[9] These findings indicate the cultural norms related to gender are influential on WPD.

Research has found gender differences in weight perceptions may not exist across all socio-economic groups. A study by Wang, Liang and Chen found girls from lower income families were less likely to classify themselves as obese, even when they medically met the criteria.[73] These findings did not address whether youth in certain ethnic/cultural groups are more likely to misinterpret their weight.

As findings have shown WPD does exist among youth, research has called for an examination of weight discrepancy across youth in different ethnic groups[12]. The research conducted to evaluate weight discrepancy in youth and adolescents is minimal and provides little clarity regarding the extent of the problem among youth who are not able to accurately perceive their own weight. Like other weight perception discrepancy research, gender differences have not been evaluated across racial/ethnic groups.

Social Comparison Theory

Social comparison theory provides a framework to evaluate differences among weight perception discrepancies across gender and ethnic groups, and can provide an important perspective for understanding the underlying mechanisms that may underlie weight discrepancy findings. SCT holds that a person creates judgments about themselves based on their views of both similar and celebrity others.[74] When Festinger first proposed this theory, he argued that social comparison would lead group members

to conform to the norms of groups to which they belonged.[75] The extent to which group members conformed to the norms of the group was tested by Schacter[76] who demonstrated affiliation and fear were central to the explanation of why social comparison happened. Later experiments, such as one completed by Gordon[77], demonstrated that people who felt their belief was less socially acceptable were more likely to affiliate with others who held beliefs outside of the norm. Wheeler[78] was able to build on Gordon's research and establish a rank-order paradigm. A rank-order paradigm indicates that people are likely to place their comparisons in an order and then use SCT to their advantage either as a protective (downward comparison) or an encouraging mechanism (upward comparison). This paradigm provides evidence that people are selective with their chosen comparison target based on how they feel about themselves.[75]

SCT relies on several basic assumptions. First, it is assumed that a person feels compelled to evaluate their opinions. Second, these opinions are objective and evaluated by comparison with the abilities and opinions of others.[74] SCT also suggests that a person is more likely to make upward comparisons by comparing oneself to those who are perceived to be better off than they are.[74] Another important component of SCT is that a person uses a selective accessibility model when making comparisons.[79] Thus, people make judgments using the information that most easily comes to mind.[79]

It was not until the 1980s that the downward comparison component of social comparison theory became widely researched. The main premise of downward comparison, as tested by Wills, was that people would feel better after spending time or

hearing about someone they deem to be worse off than they are.[80] Research by Taylor and Levin found downward comparisons were common among patients with breast cancer; such comparisons made a person feel better about their diagnosis.[75]

SCT may provide a possible explanation for possible WPD. If people are in an environment where the majority of people are overweight, they may feel they are less overweight based on their comparison to others. Downward comparisons related to WPD suggest that people are more likely to compare themselves to those who are "worse off" (a self-perception) than they are, as it will boost their self-esteem.

An additional research study of the usage of social comparisons in everyday life hypothesized that downward comparisons would increase a person's overall feelings of well-being.[78] In a study by Wheeler and Miyake, college students recorded social comparisons over a two-week period and found the choice to make upward and downward comparisons were largely based on the relationship a person had with the intended comparison target.[78] Additionally, a person's self-esteem was a strong indicator of the types of comparisons they chose to make.[78] It was found that social comparison was used prevalently in the day to day life of a group of college students, and the primary indicator of the type of comparison made (upward or downward) was the individual's self-esteem.[78] Self-esteem is an important influence on body image and it is important to also evaluate research that addresses body image and social comparison.

When evaluating WPD, if SCT holds true, identified discrepancies between actual BMI and perceived weight may indicate a lack of education about proper weight categories, as well as the risks associated with being outside of normal weight ranges.

Several research studies have focused on body image perception with regards to social comparison theory. This previous research provides a possible framework for explaining any found WPD among adolescents. A study of teenagers in Canada found adolescents were likely to use universal targets (such as celebrities, magazine models and athletes) to make comparisons with their body, and often times, these comparisons lead to a negative body image.[81] Additional research has evaluated self-discrepancy, i.e., when self-concept does not meet one's self-ideal, as it relates to the thin-ideal found in the media. The thin-ideal is the idea that women should try and have an appearance that mirrors celebrities and models. In one study, women who had higher levels of self-discrepancy were more likely to engage in social comparison with media targets than those who had lower self-discrepancy.[14] These two research studies indicate the profound influence the media has on body image comparison.

SCT has also been used to study how people evaluate their own feelings of attractiveness. Research has found that the type of relationship a person has with their intended point of comparison influences how they compare themselves with this target.[82] This research is significant because it was the first to assess not only the physical component of comparison, but also the effect of any pre-existing relationship a person might have with the person they use as the basis for comparison.[82] In terms of WPD, this finding suggests that people are more likely to have positive comparisons with people to whom they are close, which may explain WPD among groups which experience significantly higher rates of obesity.

Several studies have investigated body image evaluation and SCT. In an experiment by Cash, Cash and Butters, women were exposed to three types of magazine pictures: women who were physically attractive only; women who were physically attractive and worked as a professional model and women who were not physically attractive.[16] When exposed to women who were "physically attractive only," women listed their attractiveness as lower than women in the other two groups. Based on the results, the researchers suggested that peers may be a more influential group when people are trying to determine their own physical attractiveness.[16] While this study focused on adults, the findings may or may not apply to adolescents.

Research using SCT to evaluate weight-related perceptions has most widely evaluated those who feel they are heavier than they actually are. In a study of the effect of televised images on the body image perception of college females, when participants were specifically instructed to use the actors in the commercials as a basis of comparison, they reported higher levels of comparison than participants who were given a separate task during the viewing of the same clips.[17] The results indicate social comparison is less likely to happen unless people are deliberately trying to find a basis for comparison.

Adolescent research involving social comparison theory provides important information about the mechanisms youth use to evaluate their body image. In addition to comparisons to other peers, the media is believed to widely influence the body image of adolescents. Research looking at the effects of the media, as well as peer comparison, has found that both provide youth a strong basis of social comparison.[19] In one study,

Jones exposed ninth and tenth graders to pictures of both peers and models and found, when exposed to both picture types, youth were more likely to base their comparison on the appearance of peers rather than models.[19] When given opportunities to compare one's body to the body of a model or a peer, youth were consistently more likely to compare their body to a peer, indicating that social norms may be relevant when evaluating body image discrepancies.[19] If youth spend time in a peer group where most other members are overweight, they may be less likely to feel they are overweight.

According to Schultz, Paxton, and Werthein, body comparisons are more likely to occur when socio-cultural ideals are internalized, youth have an instable view of their body image, friends are increasingly concerned with their own weight and if thinness is considered a cultural ideal.[13] One such study of the effect of internalized ideals was completed in Canada. The researchers found exposure to parental and peer obesity led to increased misinterpretation of weight status among youth ages nine through sixteen.[33] Using pictorial images, the researchers asked children and adolescents to identify which picture they felt best resembled their weight and then used the results and their actual BMI to determine WPD. They found that children who were more frequently exposed to overweight or obese people were more likely to misinterpret their weight.[33] Thus, it is possible that children may start misperceiving their weight as early as nine years of age.

Research has indicated weight related issues are a profound problem in the United States.[12, 30, 38, 41, 42, 57, 59, 68] Additionally, youth who struggle with weight issues are more likely to experience low self-esteem, depression and other socio-emotional problems.[49, 83] While some research has been done to evaluate weight discrepancies,

research on the differences in weight discrepancy across different ethnic groups has been minimal. Additional research is needed to determine if the discrepancy differs across ethnic groups and gender. SCT may provide a possible mechanism to explain how youth feel about their weight and any differences that may exist across different ethnic groups or genders. Addressing the problem may require interventions to be more culturally driven.

Hypotheses

Based on the above literature review, the following hypotheses were formulated. For the first research question: What is the relationship between ethnicity and WPD across youth in the three racial/ethnic groups? It is expected that there will be a relationship between ethnicity and WPD. Specifically, it is expected that minority group members will be less likely to accurately perceive their weight category than non-minority subjects. It is expected that minorities will be more likely to under-perceive their weight category.

For the second research question: What is the relationship between gender and WPD across youth in the three racial/ethnic groups? It is expected that gender will be a strong predictor of WPD and that that females will be significantly more likely to over-perceive their weight. Further, it is expected males will be more likely than females to under-perceive their weight status and that gender will be a more significant predictor of over-perception of weight status than race/ethnicity.

CHAPTER III

METHODS AND PROCEDURES

The study was designed to evaluate differences in weight perception discrepancy (WPD) across students who identified in one of three racial/ethnic groups (Caucasian, African American and Latino). Additionally, the study looked at gender differences in WPD across students who identified as members of one of the aforementioned racial/ethnic groups. Data used for this study were taken from the 2009 Youth Risk Behavior Surveillance System (YRBS), which was completed by the Centers for Disease Control and Prevention (CDC) and designed to gather data about youth behaviors that influence health.

Data Source

The 2009 YRBS sampling frame included all students in public, Catholic and other private schools who lived in the United States. Schools that enrolled students in grades 6-8 or 9-12 were eligible for participation. Data were collected to be both nationally representative and representative of the populations of the cities included in the sample. Certain data collected only counted towards the local data and were not included in the national sample.[84]

Sample. To ensure a nationally representative sample, the CDC employed a three-stage cluster sample design. The sampling frame included all youth in grades nine through twelve who live in the United States and attended public, Catholic or other private schools during the fall semester of 2009.

During the first stage of the cluster sample design, states were divided into primary sampling units (PSUs), which were composed of one large county or several smaller counties clustered together. Major U.S. cities were divided into sub-PSU units to ensure that the selection probability was representative of the population.[84] Once the PSUs and sub-PSUs were established, schools were sorted by size and placed into appropriate PSUs. PSUs were then classified as urban or rural based on population. PSUs were then chosen for participation in the study using weighted probability procedures. According to the CDC, this procedure ensured that "the weighted count of students equals the total sample size, and the weighted proportions of students in each grade match the national population proportions.[84]"

During the second stage of the cluster sampling, schools were selected from PSUs chosen in the first stage of the cluster design. Schools were selected for each of the determined PSUs using the Quality Education Database.[84] This database included the enrollment and grades offered at each school. Schools that did not offer grades nine through twelve, inclusively, were considered fragment schools and, unless they could be combined with other fragment schools in the PSU, were not eligible for inclusion in the study sample.[84] Next, schools were sorted by size; one fourth of all schools within the selected PSUs that were considered small (less than 25 students in each grade) and three large schools (at least 25 students in each grade) were selected.

To ensure over-sampling for minority populations the CDC employed several methods. First, they used larger sampling rates among PSUs that were predominately populated by minority residents. Modified measures of size were used to increase the

probability of selecting schools with large numbers of minority students, and schools, which were selected and considered high in minority students, had two classes sampled per grade whereas only one class was sampled per grade in non-minority schools.

The final stage of the cluster required the random selection of one or two classes per grade at each of the selected schools. To be eligible, classes had to be classified as self-contained. Subject courses or homeroom classes were considered self-contained versus classes where students rotated to a different discipline each day.[84]

Using the outlined method, 196 schools were asked to participate in the study. Of these 196 schools, 158 schools (81%) with a cumulative enrollment of 18,573 students chose to participate. Data were received from 16,460 students. After coding was complete, the set consisted of 16,410 usable questionnaires, making the overall response rate 71% of the original 196 schools selected for participation, all schools selected for participation, regardless of response rate were calculated in the overall response rate. Questionnaires which were returned but unusable were counted as non-response as well.

Survey. To develop the YRBS survey, CDC researchers first evaluated the leading causes of death and illness among high school students.[84] Research indicated that the death or illness could be linked to tobacco use, alcohol and drug use, sexual behaviors, unhealthy dietary behaviors, and physical inactivity. Using these categories as the basis for survey development, the CDC created panels of experts for each of the behaviors. Panel members included survey specialists from the National Center for Health Statistics, staff from various CDC departments (e.g. Chronic Disease Prevention, Health Promotion, Adolescent and School Health).[84] The panel was asked to develop

high priority questions that could be completed within 45 minutes. The original version of the survey was developed in 1989 and first administered in 1991; it has been administered every other year since the inception of the study. The National Center for Health Statistics evaluated the validity and reliability of the survey. After the survey was considered reliable and valid, the protocol for administration of the survey was standardized.

Administration Procedures. Teachers or local agency staff trained by the CDC administered the surveys at the selected schools.[84] Students recorded their answers in a Scantron booklet. Schools were provided with instructions to return the completed booklet to the CDC. The survey was administered during one class-period (typically 45 minutes) and students who did not finish were given additional time to complete the survey outside of class.

Procedures for the Current Study

For the purpose of this study, questions related to weight and ethnicity were used. For the 2009 survey, students were asked if their race was Latino or Hispanic. Subsequently, students were asked to identify their race if other than Latino. Students who answered yes to the question "Are you Hispanic or Latino?" were considered members of this racial/ethnic group. Students who selected only "Black or African American" were classified as African American. Students who selected only "White" were considered as members of this racial/ethnic group. Students who select multiple groups or did not identify their race/ethnicity were excluded from sample used in the data analysis for the current study. By excluding individuals who identified themselves

as multi-racial, potential confounding variables, such as racial identity were lessened (but not eliminated). The questions that address race and ethnicity were merged to create a categorical variable that identified race/ethnicity of each of the members of the sample. The phrasing of the question in the survey made race merely a proxy, as racial identity and cultural upbringing were not addressed. Youth were placed in categories merely by identification of one race.

In the survey, students were asked to select their height in feet and inches. The CDC converted this data into a metric measurement. Weight was reported by the students in whole pounds, and subsequently converted to kilograms. The converted height and weight data were used to calculate each student's body-mass index (BMI) using the age-and-sex specific formula provided by the CDC. The age and sex specific BMI data was included in the data set provided.

BMI data were not included in the final data set if either the weight or height data were considered biologically implausible based on age and gender definitions established by the CDC. The CDC considered heights and weights that are not medically plausible (extremely skinny or morbidly obese) to be inaccurate data. In addition, the CDC eliminated heights that were medically implausible based on the age and reported weights (Appendix 1).

To determine students' perception of their weight, one item from the survey was utilized. Students were asked, "How do you describe your weight?" Students selected one of the following answers: "very underweight, slightly underweight, about the right weight, slightly overweight or very overweight."[85] Response categories were collapsed

to create four categories: underweight (very underweight and slightly underweight were combined), normal weight, overweight, and obese.

The discrepancy between weight category as determined by a student's BMI and the student's weight category was used to construct the dependent variable for this study. To arrive at this value, BMI Scores were converted into a categorical variable of underweight, normal weight, overweight or obese based on the index of BMI weight classifications provided by the CDC.[1] These categories were the same as the categories students were asked to identify on the YRBS survey. The two scores were assigned numerical classifications (underweight -1, normal weight 0, overweight 1, obese 2) and actual weight was subtracted from perceived weight. . Successful identification of weight category was the reference category for this study (-1= over-perception of weight category 0=successful identification of weight or 1=under-perception of weight category). The resultant scores were used as the values for the discrepancy variable used as the basis for statistical analysis.

Data Analysis

Data handling. Data were downloaded from the CDC website. The data were provided as a raw data spreadsheet. Once the data were obtained, the data were screened for accuracy and missing items. Cases with missing height, weight, gender or ethnicity were eliminated. Youth who identified as more than one ethnic group or as an ethnic group not of interest in this research were eliminated from the analyses. The data set was then imported into SPSS for analyses.

Data screening was conducted to meet the assumptions necessary to use maximum likelihood estimation. This variable was calculated by finding a raw difference between the weight category provided by the reported BMI and the perceived weight category in which a child places him/herself.[41]

Statistics. Because the dependent variable being tested is categorical, ordinary least squares (OLS) regression techniques may produce illogical and out of bounds results. Therefore, a maximum likelihood estimation (MLE) procedure, i.e., logistic regression, was utilized for the data analyses. Since the dependent variable was categorized at more than two levels, direct multinomial logistic regression procedures were performed to explore how different relationships of demographic characteristics (e.g. age, gender and race/ethnicity) of participants were associated with weight perceptions (e.g., underestimated, accurately estimated, or overestimated) with accurate estimation serving as the reference category. MLE was used as the estimating equation in the multinomial logistic regression model. The interaction between race and gender was also tested. A likelihood-ratio test was performed to determine the fit of the overall model. Odds ratios and Wald's χ^2 were examined as measures of effect size for individual model parameters. An alpha level of .05 was used for all statistical analyses. The model below is the full theoretical model that was used to estimate the discrepancy.

$$\text{Log } (P(\text{Category i}))/P(\text{Category j})) = Bi0 + Bi1(\text{Race}) + Bi2(\text{Gender}) + Bi3(\text{Race X Gender})$$

Where Category j = reference category
Where Category i = category of interest

Comparisons were made using the sample of Caucasian males as a reference category. For the first research question, comparisons were made using Caucasian students as the reference group for WPD among Latino and African American students to determine if a difference exists between Caucasian students WPD and minority students WPD. Evaluations were done with age-controlled and non-age controlled data. For this research question, only race/ethnicity was used as a predictor. Each group was used as a baseline comparison to evaluate whether the other groups were more or less likely to accurately perceive their weight. Utilization of these statistical measures will allow this study to look at the likelihood of minority students to predict their actual weight category in terms of comparison with students who identify as Caucasian.

For the second research question, males were used as a reference to compare WPD among males and females. Similar procedures and comparisons between males and females were made. A further analysis of the interaction between race and gender was also run. All models were run using both age-controlled and non-age controlled analyses.

Finally, analyses were done which evaluated weight perception and weight class as well as age. For the comparison of weight perception and weight class, a chi-square analysis was done to evaluate the number of youth in each BMI category that over-, accurately or under-perceived their weight.

The results indicate whether certain groups were more or less likely to perceive accurately their weight. These analyses were the basis for the discussion of perceived weight versus actual weight category.

CHAPTER IV

RESULTS

To examine whether WPD exists among adolescents from different minority groups, data from a total of 11,741 students were used for this analysis. The distribution of these students both based on gender and ethnicity was a close enough match to the population estimates according to the 2009 Census that this was deemed to be a representative sample[86]. The increased prevalence of minority groups in the sample can be accounted for by the over-sampling that took place in the data collection process. The breakdown by gender was 5,861 females and 5,880 males; and by ethnicity/race: 6,550 Caucasians, 2,731 Hispanic and 2,560 African Americans (Table 1).

Table 1: Summary Data Statistics

	Total from Sample	2009 Census Data
Gender		
Female	5,861 (49.99)	143,368,000 (50.94)
Male	5,880 (50.01)	138,056,000 (49.06)
Race/Ethnicity		
African American	2,560 (21.80)	35,705,000 (12.69)
Caucasian	6,450 (54.93)	228,107,000 (81.34)
Latino	2,731 (23.23)	35,306,000 (12.55)

Of these students, 54.93% correctly identified their weight category, 23.26% under-perceived their weight category (believed they were lighter than they actually were) and 21.80% over-perceived their weight category (believed they were heavier than they actually were (Table 2).

Table 2: Weight Perception Summary

	Over Perceived Weight	Accurately Perceived Weight	Under Perceived Weight	Totals
Race				
Caucasian	1013 (15.70)	4193 (65.00)	1244 (19.22)	6450 (54.93)
Latino	356 (13.04)	1665 (60.97)	710 (26.00)	2731 (23.26)
African-American	202 (7.89)	1487 (58.09)	871 (34.02)	2560 (21.80)
Totals	1571 (13.38)	7345 (62.65)	2825 (24.06)	11741

Separating WPD by racial/ethnic groups revealed significant differences. Among African Americans, 7.89% of youth over-perceived their weight, whereas 34.02% of African American youth under-perceived their weight. Among Latino students surveyed, 13.03% of students under-perceived their weight and 25.99% of students over-perceived their weight. Among Caucasian students surveyed, there appeared to be a lesser difference in over and under-perception of weight. 15.70% of students over-perceived their weight and 19.29% of students under-perceived their weight. These findings

indicate minority students are more likely to perceive their BMI category as lower than they would be classified medically.

Logistic regression was used to facilitate more in-depth analysis of the associations between WPD and race/ethnicity. Results indicate that both Latinos and African American students were more likely to under-perceive their weight than Caucasian students. Utilizing the odds-ratio given in multinomial logistic regression, African American students were nearly two times more likely to estimate their weight category as lighter than it actually is than Caucasian students; Latino students were approximately one and a half times more likely than Caucasian students to under-estimate their weight. African Americans and Latino students were .576 and .122 times less likely, respectively, to over-perceive their weight category as heavier than it actually is (Table 3). There was a relatively low strength of association using ethnicity as a descriptor, indicating ethnicity may not be the best predictor of WPD. Nagelkerke's pseudo r-squared was 0.027, indicating a very small amount of the variability found can be explained using only race as a predictor. Controlling for age (Table 4) did not significantly alter the results but did explain more of the variability as Nagelkerke's pseudo r-squared was 0.053, which still indicates race is not the best predictor for weight perception discrepancy.

Table 3: Multinomial Logistic Regression of WPD Based on Race/Ethnicity

(N=11,741)

						Exp(B)	95% Confidence Interval for Exp(B)	
	B	Std. Error	Wald	DF	Sig.	(Odds Ratio)	Lower Bound	Upper Bound
-1.00 Over-perception of weight status								
Intercept	1.392	.035	1612.835	1	.000			
African American	-.570	.081	48.964	1	.000	.566	.482	.663
Latino	-.131	.067	3.789	1	.052	.877	.768	1.001
Caucasian	0[b]	.	.	0	.	.	.	.
1.00 Under-perception of weight status								
Intercept	-1.225	.032	1425.420	1	.000			
African American	.670	.054	155.461	1	.000	1.955	1.759	2.172
Latino	.354	.056	40.535	1	.000	1.424	1.277	1.588
Caucasian	0[b]	.	.	0	.	.	.	.

Note: Reference category is: 0.00 – accurate weight perception:

Nagelkerke's $R^2 = 0.027$

Table 4: Age Controlled Multinomial Logistic Regression of WPD Based on Race/Ethnicity (N=11,741)

							95% Confidence Interval for Exp(B)	
	B	Std. Error	Wald	DF	Sig.	Exp(B) (Odds Ratio)	Lower Bound	Upper Bound
-1.00 Over-perception of weight status								
Intercept	1.392	.035	1612.835	1	.000			
African American	-.570	.081	48.964	1	.000	.566	.482	.663
Latino	-.131	.067	3.789	1	.052	.877	.768	1.001
Caucasian	0[b]	.	.	0	.	.	.	.
1.00 Under-perception of weight status								
Intercept	-1.225	.032	1425.420	1	.000			
African American	.670	.054	155.461	1	.000	1.955	1.759	2.172
Latino	.354	.056	40.535	1	.000	1.424	1.277	1.588
Caucasian	0[b]	.	.	0	.	.	.	.

Note: Reference category is: 0.00 – accurate weight perception:

Nagelkerke's $R^2 = 0.053$

For gender, results indicate significant differences in how males and females perceive their weight. In this sample, girls were over ten times more likely than boys to over-perceive their weight category and, subsequently, were 84% less likely to under-perceive their weight category (Table 5). The age adjusted table for gender indicates similar findings (Table 6). The strength of association for this model is much stronger than it was for the model with ethnicity, indicating gender is a better predictor of WPD in this sample. Nagelkerke's pseudo r-squared was 0.325 indicating gender is a stronger predictor than ethnicity. Though this statistic is an approximation and not directly comparable to R^2 in OLS regression, it indicates a moderate strength of association between the dependent and predictor variables. As one measure of model discrimination, predicted probabilities were used to generate a classification table.

In addition to the gender and ethnicity analysis, interactions between the two groups were evaluated. The results indicate there are interactions between weight and gender (Table 7). When separated by race and gender, females are still significantly more likely than males to over-perceive their weight. Specifically, Caucasian females were nearly twice as likely to over-perceive their weight. males to over-perceive their weight. Both African American and Latino males were more likely than Caucasian males to under-perceive their weight and females in all ethnic groups were less likely to under-perceive their weight. As a measure of effect size, Nagelkerke's pseudo r-square was .095for the full model. When controlled for age (Table 8), Nagelkerke's pseudo r-square was 0.118 indicating that age-controlled interactions between race and gender were the best overall predictor for WPD.

Table 5: Multinomial Logistic Regression of WPD Based on Gender (N=11,741)

							95% Confidence Interval for Exp(B)	
	B	Std. Error	Wald	D F	Sig.	Exp(B) (Odds Ratio)	Lower Bound	Upper Bound
-1.00 Over-perception of weight status								
Intercept	-2.022	.049	1693.556	1	.000			
Female	.822	.060	190.409	1	.000	2.276	2.025	2.558
Male	0[b]	.	.	0	.	.	.	.
1.00 Under-perception of weight status								
Intercept	-.640	.029	501.157	1	.000			
Female	-.784	.047	282.780	1	.000	.457	.417	.500
Male	0[b]	.	.	0	.	.	.	.

Note: Reference category is: 0.00 – accurate weight perception: Nagelkerke's R^2 = 0.63

Table 6: Age Controlled Multinomial Logistic Regression of WPD Based on Gender (N=11,741)

							95% Confidence Interval for Exp(B)	
	B	Std. Error	Wald	DF	Sig.	Exp(B) (Odds Ratio)	Lower Bound	Upper Bound
-1.00 Over-perception of weight status								
Intercept	-.926	.123	56.411	1	.000			
Age	-.219	.023	89.598	1	.000	.803	.768	.841
Female	.822	.060	188.997	1	.000	2.276	2.024	2.559
Male	0[b]	.	.	0	.	.	.	.
1.00 Under-perception of weight status								
Intercept	-1.791	.107	279.720	1	.000			
Age	.216	.019	126.958	1	.000	1.241	1.196	1.289
Female	-.783	.047	278.725	1	.000	.457	.417	.501
Male	0[b]	.	.	0	.	.	.	.

Note: Reference category is: 0.00 – accurate weight perception: Nagelkerke's $R^2 = 0.63$

Table 7: Multinomial Logistic Regression of WPD Based on Race/Ethnicity and Gender (N=11,741)

						Exp(B) (Odds	95% Confidence Interval for Exp(B)	
	B	Std. Error	Wald	DF	Sig.	Ratio)	Lower Bound	Upper Bound
-1.00 Over-perception of weight status								
Intercept	-1.960	.063	979.390	1	.000			
African American	-.305	.140	4.730	1	.030	.737	.560	.970
Latino	-.048	.120	.159	1	.690	.953	.753	1.206
Caucasian	0	.	.	0	.	.	.	.
Female	.921	.076	147.936	1	.000	2.511	2.165	2.912
Male	0[b]	.	.	0	.	.	.	.
African American*Female	-.422	.173	5.971	1	.015	.656	.467	.920
African American*Male	-.131	.146	.801	1	.371	.878	.659	1.168
Latino*Female	0	.	.	0	.	.	.	.
Latino*Male	0	.	.	0	.	.	.	.
Caucasian*Female	0	.	.	0	.	.	.	.
Caucasian*Male	0	.	.	0	.	.	.	.
1.00 Under-perception of weight status								
Intercept	-.809	.040	416.041	1	.000			
African American	.500	.071	49.228	1	.000	1.648	1.434	1.895
Latino	.235	.071	10.977	1	.001	1.265	1.101	1.453
Caucasian	0	.	.	0	.	.	.	.
Female	-1.119	.073	236.749	1	.000	.327	.283	.377
Male	0[b]	.	.	0	.	.	.	.
African American*Female	.611	.113	29.253	1	.000	1.843	1.477	2.300
African American*Male	.431	.118	13.312	1	.000	1.539	1.221	1.941
Latino*Female	0	.	.	0	.	.	.	.
Latino*Male	0	.	.	0	.	.	.	.
Caucasian*Female	0	.	.	0	.	.	.	.
Caucasian*Male	0	.	.	0	.	.	.	.

Note: Reference category is: 0.00 – accurate weight perception: Nagelkerke's R^2 =.095

Table 8: Age Controlled Multinomial Logistic Regression of WPD Based on Race/Ethnicity and Gender (N=11,741)

						Exp(B) (Odds	95% Confidence Interval for Exp(B)	
	B	Std. Error	Wald	DF	Sig.	Ratio)	Lower Bound	Upper Bound
-1.00 Over-perception of weight status								
Intercept	-.898	.129	48.220	1	.000			
African American	.923	.076	147.706	1	.000	2.518	2.170	2.922
Latino	0[b]	.	.	0	.	.	.	.
Caucasian	-.275	.141	3.828	1	.050	.759	.576	1.001
Female	-.048	.120	.160	1	.689	.953	.753	1.207
Male	0[b]	.	.	0	.	.	.	.
Age	-.213	.023	84.074	1	.000	.808	.772	.846
African American*Female	-.428	.173	6.091	1	.014	.652	.464	.916
African American*Male	-.142	.146	.940	1	.332	.868	.651	1.156
Latino*Female	0[b]	.	.	0	.	.	.	.
Latino*Male	0[b]	.	.	0	.	.	.	.
Caucasian*Female	0[b]	.	.	0	.	.	.	.
Caucasian*Male	0[b]	.	.	0	.	.	.	.
1.00 Under-perception of weight status								
Intercept	-1.909	.111	295.660	1	.000			
African American	-1.123	.073	236.473	1	.000	.325	.282	.375
Latino	0[b]	.	.	0	.	.	.	.
Caucasian	.469	.072	42.698	1	.000	1.598	1.389	1.840
Age	.235	.071	10.886	1	.001	1.265	1.100	1.455
Female	0[b]	.	.	0	.	.	.	.
Male	.208	.019	115.409	1	.000	1.231	1.186	1.279
African American*Female	.620	.114	29.803	1	.000	1.860	1.488	2.324
African American*Male	.448	.119	14.248	1	.000	1.566	1.241	1.976
Latino*Female	0[b]	.	.	0	.	.	.	.
Latino*Male	0[b]	.	.	0	.	.	.	.
Caucasian*Female	0	.	.	0	.	.	.	.
Caucasian*Male	0	.	.	0	.	.	.	.

Note: Reference category is: 0.00 – accurate weight perception: Nagelkerke's R^2 =.118

An evaluation of youths' weight perceptions based on their weight class provided indications of which groups are more likely to over or under-perceive their weight (Table 6). Of students who are medically classified as underweight, over 50% overestimated their actual weight. As a comparison, under 14% of youth who were normal weight classified themselves as heavier. As the questions on the survey were worded as such that feeling underweight was the lowest category a student could select, it cannot be determined if under-perception of weight exists among this group. The majority of the youth who were normal weight identified themselves as such. The normal weight youth who misidentified their weight status did so at a similar rate between over and under perception. There was a much more significant difference among youth who were medically classified as overweight. More than 45% of these youth under-perceived their weight, while 3% over-perceived their weight. This comparison is significant when compared to youth who were in the normal range. As obese youth could not "under-perceive" their weight, based on the limitations of questions asked in the survey, comparisons between overweight and obese weight perception could not be made. Youth who were obese were not able to say they felt they were heavier than they actually were as this was the highest category available for these youth. However, among students medically classified as obese, over 75% identified as lighter than their actual weight (Table 9).

Table 9: Chi Square of Weight Class and Weight Perception Discrepancy (N=11,741)

	WPD			
Weight Class	-1.00 Over-Perception of Weight Status	0.00 Accurate Perception of Weight Status	1.00 Under-Perception of Weight Status	Total
Under weight	45544 (50.80)	441 (49.2)	--	896
Normal Weight	1076 (14.3)	5532 (73.3)	940 (12.5)	7548
Overweight	83 (3.7)	1140 (51.4)	995 (44.9)	2218
Obese	0	231 (21.41)	848 (78.59)	1079
Total	1614 (13.7)	7344 (62.6)	2783 (23.7)	11741

Pearson Chi-Square 411.612

CHAPTER V

DISCUSSION AND CONCLUSION

Weight perception discrepancy potentially contributes to the increasing prevalence of weight related issues among adolescents. Results from this research indicate there is a difference in WPD between different race and gender groups. Understanding the relationship between WPD and race can provide information about how to best target treatment and interventions for specific populations, e.g., ethnic groups or genders.

Consistent with the first hypothesis, WPD was more likely to occur among members of certain minority groups. It was found that African American students were 1.974 times more likely to under-estimate their weight than Caucasian students. In addition, Latino students were 1.421 times more likely than Caucasian students to under-estimate their weight. In regard to over-perception of weight, African Americans and Latino students were .576 and .122 times less likely, respectively, to over-perceive their weight category. While this research cannot determine causality, previous evaluations have found there are many potential contributors to the identified differences. These contributors include prevalence of media exposure, availability of fast-food, cultural norms related to appearance, and acculturation rates.[8, 20, 66, 73, 87-89] The findings were significant and suggest that future research should evaluate the correlation between specific contributors to obesity and weight perception among minorities.

The second hypothesis was also supported by the results. Females were significantly more likely than males to over-perceive their weight. The finding that

females are more likely to over-perceive their weight status is consistent with previous research, which found that adolescent girls were significantly more likely to perceive themselves as overweight.[43, 53] Results from both the current and previous research may be explained using social comparison theory.

SCT research has shown females, who use celebrities or models as a basis of comparison when judging their own body, more frequently engage in "pathological weight control practices such as vomiting to lose weight than those who do not consider celebrities to be an important comparison group."[81(576)] The relationship between over-perception of weight may also be indicative of a skewed self-perception based on social comparisons with unrealistic images of models and celebrities. The findings from Morrison, Kalin and Morrison's research indicate that social comparison to those who over-perceive their weight can be harmful to the body image of adolescents.[81] It may be worth addressing if the same processes occur among those that under-perceive their weight.

In addition to the other findings, an interaction between race and gender was found, as Caucasian girls were determined to be the most likely to over-perceive their weight. This result is supported by previous research, which found Caucasian females are more likely to compare their bodies with models and celebrities who are typically classified as underweight[90]. The same results were not found for the other two ethnicity groups. Differences could be due to differing definitions of beauty among members of different groups. Research has previously demonstrated that African American females have higher body satisfaction scores than either Latino or Caucasian females, which may

indicate they are less likely to compare their bodies with models or celebrities who are underweight.[49, 91] Increased body-satisfaction scores may also be a result of the perception that the normal, white body type is considered the ideal healthy body weight. As African Americans and Latinos distribute their body weight differently, carrying extra weight may have different implications for weight-related health concerns.[87, 92] Further research is needed to determine if different views of what a healthy weight is may contribute to WPD.

The findings from this study enhance previous research, which focused on body image and appearance as they relate to disturbed eating practices among various ethnic groups.[5, 10, 53] Previous research utilized those with known eating disorders to evaluate differences in over-perception of weight status. These findings, while significant, did not address the issues related to under-perception of weight status, which were also found in the present research. SCT provides a plausible framework for evaluating the identified weight perception discrepancies. As higher prevalence of obesity is documented in minority groups, it is plausible youth who are overweight, but do not perceive themselves as heavy, is the norm in their community.[36]

SCT suggests that the process of priming, the idea that previous exposures have primed the brain to more quickly reach a certain judgment, is widely prevalent in society. This process may provide a plausible explanation for WPD.[15] Thus, as people become more primed to an image or to a person, their comparison may be affected when they make judgments based on their exposure to the person or image. This phenomenon was documented by Herr, who determined that when participants are primed with the

extreme hostility toward Hitler by exposure to audio clips of him berating troops and prisoners, they later judged a deliberately hostile fictitious character as less hostile than participants who were not primed.[93] It is still undetermined if priming for physical traits is as influential as personality traits.

In the case of media exposure to obesity and overweight, extreme priming has been documented in research. When the media discusses obesity, it is typically extreme cases, specifically those considered morbidly obese. Exposure to these cases may prime individuals to view themselves as less obese. Furthermore, there is a certain media fascination with obesity in many scripted television series. Research evaluating the portrayal of body weight on children's television shows indicate that only a select number of shows had characters considered above average weight, but this number was considered on par with the national average of obesity (15 percent) among youth at the time.[94] Also significant is results from Robinson et al. who demonstrated that characters who were overweight were not stereotyped, as found in previous research, but none of the overweight characters were actively trying to reduce their weight.[94] This can also be seen on shows geared toward older youth and adults, such as "The Simpsons" and "Mike and Molly."[95, 96] The priming that takes place by watching television with overweight characters, who are not working to reduce their weight, may contribute to the social processes that take place when youth are asked to evaluate their own weight.

In addition to priming used as a means for comparison to body image, research suggests that social comparison is widely used as a coping mechanism among those struggling with serious medical illnesses, such as auto-immune disorders and cancer.[97]

While many argue obesity does not have the same medical classification as these illnesses, the increased prevalence of WPD among minorities who experience higher overall rates of obesity indicates that SCT may provide a plausible explanation for the discrepancies. Wood defines social comparison "as the process of thinking about information about one or more other people in the relation to the self."[98(523)] This definition may explain the discrepancies in weight perception found in this research. Youth who demonstrate WPD in either direction (over- or under-perception of weight) may compare themselves to as few as one of their peers, and may make a judgment about their own weight using a small comparison group.

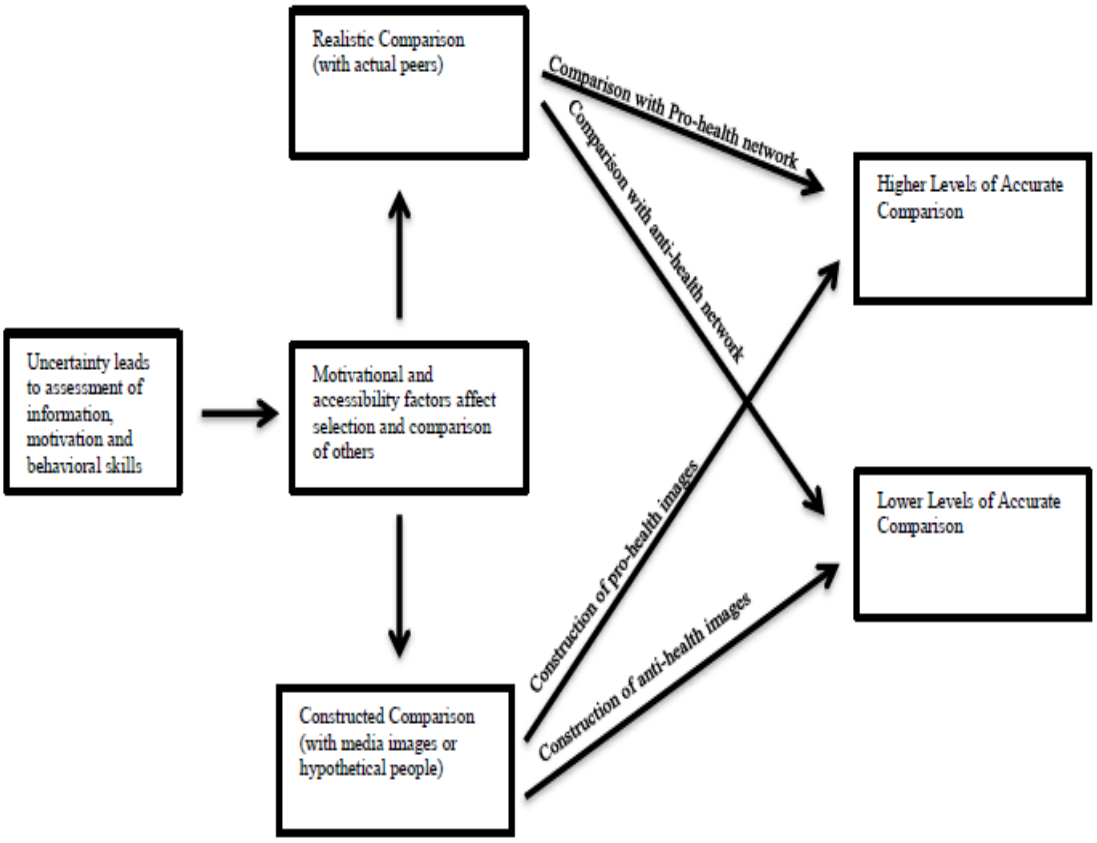
In addition to comparing themselves to peers, adolescents may use subjective measures of models when they over-perceive their weight. Research has indicated these measures are used only when objective measures do not exist.[99] This facet of social comparison theory holds that people would rather use more objective measures for evaluation, but when this does not exist, people seek out comparisons to others.[99] This component of SCT provides possible insights into a potential lack of education and awareness related to the objective measures of obesity (BMI) created by the government. It is also important to evaluate the types of awareness that currently exist. Judgments are far more likely to take place when they are applicable to one's own life.[15] Campaigns to increase awareness of obesity need to incorporate minority members into their materials in order to increase the likelihood of appropriate judgments among minority populations. For example, in Australia, campaigns for healthy weight maintenance can be found on city buses that transport many individuals from the lower-to-middle working class.[100]

Awareness and education about obesity, and obesity related health problems, may provide objective mechanisms for comparison and reduce the apparent social comparisons that take place.

The role of images in the process of social comparison has found that adolescents, regardless of age, use images as a means for social comparison with regard to health and health behavior.[101] The result that adolescents are very concerned and influenced by social comparison, coupled with the findings from this research, may provide a key to addressing WPD among this age group. While research has evaluated the influence of social images on risk behaviors related to drugs and alcohol, extrapolation of these data to evaluate the influence of social images on WPD may be a critical next step.

A model of social comparison, developed by Misovich, Fisher and Fisher[102] for application to AIDS related health behavior may be applicable to social comparisons related to WPD. Adapted to WPD concerns, this model (Figure 1) suggests both realistic comparison (true peers) and constructed comparison (media images) as a basis for comparison. Youth arrive at either higher or lower levels of accurate weight comparison based on how they appraise themselves with respect to others. A controlled experiment is needed to determine if this model outlines the specific processes associated with WPD.

Figure 1: Social comparison processes and WPD risk and WPD prevention behavior[102]



The data suggests that ethnicity is a factor that influences the likelihood of youth to accurately or to inaccurately perceive their weight. The findings of this research suggest Caucasian females are more likely to use unrealistic comparisons and over-perceiving their weight, whereas minorities are more likely to use unrealistic comparison to under-perceive their weight. Fortunately, the majority of the data suggests that youth use realistic comparisons and arrive at accurate accounts of their weight comparison.

The correlation between WPD and exposure to both unrealistic and realistic models for body comparison supports this model. As discussed above, the sensationalized view of obesity, as well as the focus on extreme cases, may cause adolescents to construct unrealistic comparisons and arrive at lower levels of accurate weight perception. A post-hoc analysis of the correlation of WPD with increased television viewing ($r^2 = .40$) did not provide evidence that increased television viewing leads to higher levels of WPD. However, other factors may influence the results. For example, youth who watch high amounts of television are typically more sedentary and may be less likely to care that they are overweight or obese[103]. A controlled experiment in which children were exposed to either accurate or inaccurate comparisons, and then asked to make a self-judgment, would be a useful next step in evaluating the applicability of the model proposed to WPD.

There were several limitations relative to the current research.[102] First, while the measure of BMI is widely used, it remains controversial. BMI is simply a measurement of the relationship between weight and height and does not take into account muscle and fat percentages. Thus, BMI measurements may not provide an accurate reflection of true

weight status in children over the age of ten.[104] However, despite its limitations, BMI still remains the easiest and most used method for determining weight category in a non-clinical setting.

Another limitation of this research is the exclusion of multi-racial youth from the analyses. As it was stated in the survey, youth were asked to first select if they identified as "Hispanic" and then were subsequently asked to select a race, which included a variety of racial and ethnic identifications. This wording may have confused youth and may have led to the inadvertent selection of multiple categories. By excluding youths who identified as multi-racial this research excluded about 14 percent of the population. Nonetheless, the confounding variables that were associated with the inclusion of this population necessitated their exclusion. The key issue with the inclusion of multi-racial youth is the inability to determine the type of environment from which they choose to take meaning about socially acceptable behavior. By using SCT, assumptions were made the environment, where children and their peers were mostly of the same race.[105] While this assumption was certainly not valid in all cases, trends in the data indicate that youth spend most of their time interacting with others who identify in the same racial category.[105] Future research should be done to evaluate WPD among youth who identify as multi-racial in an environment where more is known about peer affiliation and cultural meaning.

Future research should address other potential correlates of WPD among youth. The YRBS provides a number of additional factors that could be evaluated with respect to WPD. Particular areas of interest include dietary behaviors and physical activity and

their effect on WPD. In addition, for evaluation of other ethnic groups, WPD could provide additional insight.

In addition, evaluation of data from younger children will provide indications of when WPD begins. Parents do not always accurately interpret their child's weight, but identifying when children begin to show WPD could provide health professionals with information about when to target awareness of healthy weight.[20, 31, 45, 61, 67]

Finally, future research should include further environmental controls to better evaluate the model proposed by Misovich, Fisher, and Fisher and to determine if this model is applicable to WPD. A controlled experiment where participants are exposed to either accurate or inaccurate comparison images and then asked to make a self-judgment would provide evidence as to whether this model is applicable to adolescent's weight perception.

The knowledge that under-perception of weight is more common among minorities requires practitioners to evaluate current weight management campaigns to determine if content is appropriate and effective for all minority groups. Campaigns may need to become more pictorial and include photographs of people from a variety of different ethnicities. In addition, it may be important to pair current BMI weight classifications with pictures. These pictures may enable people to have a more appropriate basis for comparison. In addition, it may be important to target media to more accurately reflect the implications associated with being overweight or obese and remove the unrealistic view of obesity that often appears in the media.

This research provides evidence that adolescents do not always accurately perceive their weight. The differences found among ethnic groups provide evidence that specific interventions which target specific minority groups are needed to help create awareness about healthy weight. Furthermore, while the data did not indicate causation, the findings indicate the interpretation of BMI may be different for different minority groups. This different interpretation may be justified, as it has been found that different distribution of body fat is correlated with higher risk for many illnesses, such as heart disease.[106] This result, coupled with differences in WPD among the groups, may indicate the need to develop a different measure of body weight classification that incorporates race into what constitutes a healthy body weight. In addition, continued interventions are needed to teach females how to assess appropriately media images of models with respect to what constitutes a healthy weight. In addition, it may be beneficial to separate males and females in discussions related to body image, since it appears that perceptions between the two genders are quite different.

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APPENDIX 1

Biologically Implausible Value Edits of BMI (CDC, 2009)

Age	Males	Females
≤ 10	Weight: 13.61-90.72 kg Height: 0.94-1.68 m BMI: 11.5 –41	Weight: 13.61-90.72 kg Height: 0.94-1.73 m BMI: 11-40
11-12	Weight: 20.41-136.08 kg Height: 1.02-1.83 m BMI: 11.5-41	Weight: 15.88-136.08 kg Height: 1.02-1.83 m BMI: 11-40
13-14	Weight: 27.22-181.44 kg Height: 1.27-1.98 m BMI: 13-55	Weight: 27.22-181.44 kg Height: 1.27-1.98 m BMI: 13-55
≥ 15	Weight: 31.75-181.44 kg Height: 1.27-2.11 m BMI: 13-55	Weight: 27.22-181.44 kg Height: 1.27-1.98 m BMI: 13-55

APPENDIX 2

Healthy Weight Chart (CDC, 2009)

BMI	Weight Status
Under 18.5	Underweight
18.51-24.9	Normal Weight
25.0-29.9	Overweight
30.0 and Above	Obese

VITA

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